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ABSTRACT

Multigrade schools, which combine students of different ages and abilities in one classroom under one teacher's direction, are supported by numerous World Bank projects. This paper aims to increase staff awareness of the complexity of such components and their economic and pedagogical benefits. Pedagogical techniques and outcomes form the core of multigrade teaching. Although multigrade instruction occurs in both developing and industrialized countries, current administration and teacher preparation systems tend to ignore it. Administrators must focus more on strategies affecting actual teacher behavior and role perceptions. Teachers should be resource persons, managers, and facilitators of the learning process. Multigrade schools will succeed if teachers adopt more effective teaching practices, if adequate programmed learning materials are available, if local and regional support networks are developed among teachers, and if national support is given to pilot programs. National level policy decisions regarding educator training, teacher recruitment and support, and materials development become inevitable when a pilot program leads to a large-scale expansion. Appendices contain population density charts, implementation costs and savings information, and a sample pedagogical workshop format. (Contains 39 references.) (MLH)

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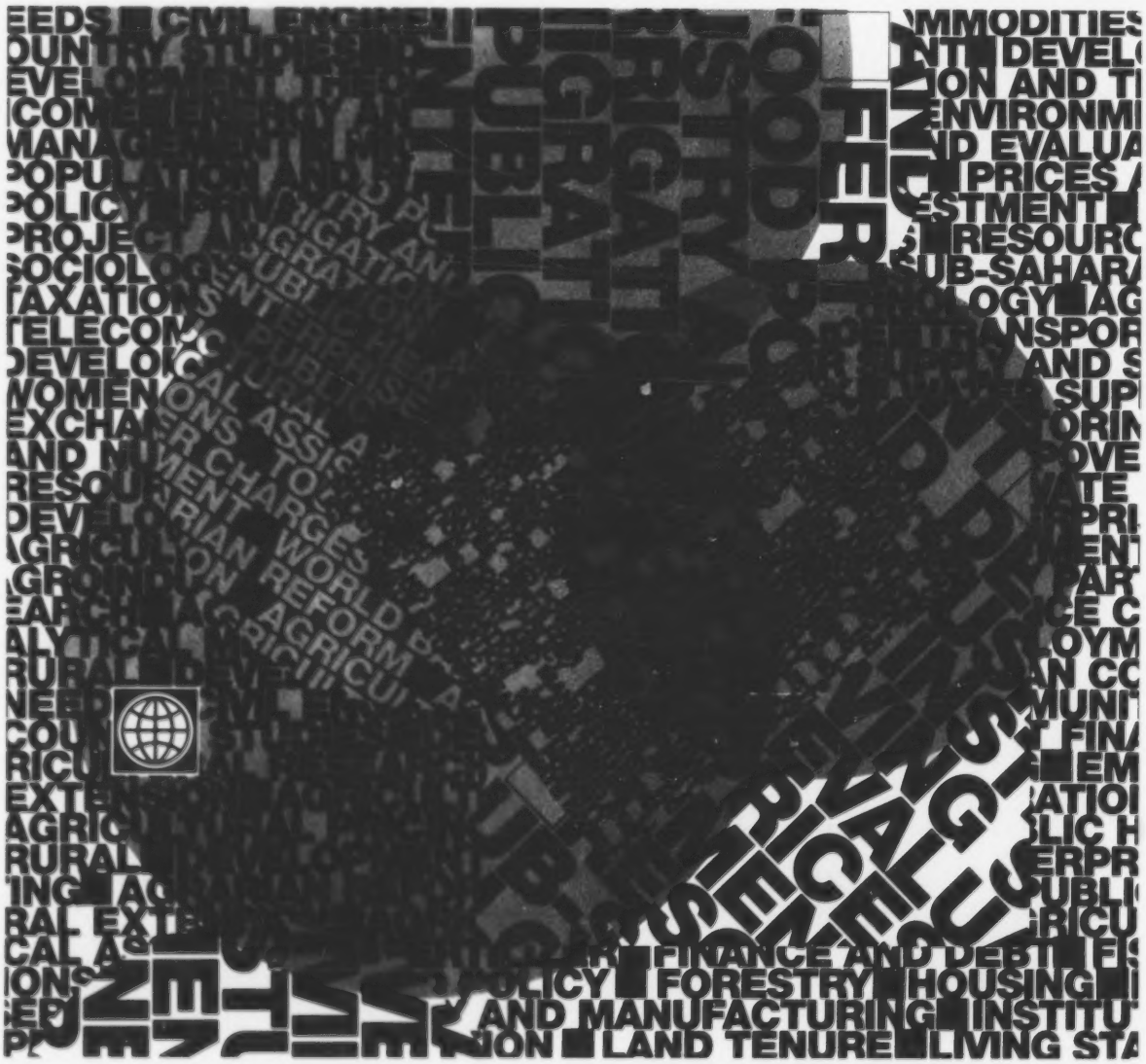
Issues in the Development of Multigrade Schools

Christopher Thomas and Christopher Shaw



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Issues in the Development of Multigrade Schools

Christopher Thomas and Christopher Shaw

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Abstract

Multigrade schools combine students of different ages and different abilities in one classroom, under the direction of one teacher. Multigrade schools are supported by a number of World Bank projects. The purpose of this paper is to increase staff awareness of the complexity of such components and of the scope for economic and pedagogical benefits that can be derived if such components are properly designed. The paper aims to give staff a clear picture of what multigrade teaching involves, and to help them acquire the tools to assess under what circumstances multigrade teaching should be promoted. It stresses the point that building a successful multigrade school program involves much more than providing hardware and developing administrative structures: pedagogical techniques and outcomes form the core of multigrade teaching.

Multigrade instruction is a reality in both developing and industrialized countries. But current systems of administration and teacher preparation tend to ignore it, with consequences for the whole educational system. Educational administrators must focus more on strategies that affect actual teacher behavior, and changing the way teachers view themselves and are viewed by central authorities. The teacher's role should be one of a resource person, a manager and facilitator of the learning process.

There are four critical elements to consider in supporting multigrade schools, the first of which is the most important: (1) teachers need to adopt more effective teaching practices to make multigrade schools function properly; (2) to do so, they require adequate material and physical inputs of which programmed learning materials and textbooks are of overwhelming importance; (3) local and regional support networks need to be developed among teachers; and (4) there must be national level support for pilot programs, including both financial support and active involvement of a few key multigrade advocates. National level *policy decisions* with regard to teacher and administrator training, teacher recruitment and support, and materials development and supply to support multigrade schools become unavoidable when the pilot program leads to large scale expansion.

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Foreword

Provision of universal basic education requires ever-increasing efficiency in the use of educational resources, innovative methods for reaching sparsely populated rural areas, and adoption of pedagogical practices which help to boost achievement.

This study "Issues in the Development of Multigrade Schools" examines the advantages offered by the multigrade schooling model. It shows that, when properly implemented, multigrade schooling is a cost-effective means of both expanding access and increasing learning achievement. The study examines the results of multigrade experiments around the world, and describes "best practices" with regard to program implementation. It discusses consequences for program implementation at the classroom, regional, and national levels. Finally, it points out that, while many of the teaching and teacher training practices proposed in the study must be adopted to make multigrade schools function properly, single-graded schools could also benefit from them.

The study is intended for development agency staff, government officials, and students and professors in teacher training institutes. By providing a wide variety of cases and models of program implementation, this study sets the framework for a healthy debate on the merits of multigrade schooling and the design of country- specific strategies.

Ann O. Hamilton

Director

Population and Human Resources Department

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I. Introduction

For the purposes of this paper, multigrade schools are taken to be those which combine students of different ages and different abilities in one classroom. They take a wide variety of organizational forms, ranging from grouping of several formal grade divisions under the direction of one teacher to a completely non-graded learning environment. This is contrasted with the "traditional" school in which each class is made up of a distinct grade with its own teacher and classroom.

Multigrade schools occupy a unique place in the history of education. The multigrade school, or the one room school house, was the dominant model of educational provision in North America until the advent of the industrial revolution and large scale urbanization. Schools in Great Britain traditionally used a "monitoring" system, in which older, more advanced students helped to supervise and tutor younger students. Single graded classes evolved in the 1800s as a means of managing students by organizing them into age divisions or grades. The graded textbook, state supported education and the demand for trained teachers further solidified graded school organization. Critics of the graded school system point out that it was developed to manage large numbers of students rather than meet individual needs, and that it is absurd to expect children to be at the same stage of development in a given grade (Miller, 1989).

The multigrade school, however, is still important as an organizational form in many suburban and rural areas of North America and Europe. Multigrade schools provide quality services in rural parts of Scotland, the Scandinavian countries, Canada, France and the United States. In many urban areas multigrade classes form part of experimental learning and teaching programs which try to capture the benefits of peer tutoring and independent inquiry. In France, Britain and the Netherlands, multigrade schools have been established in small communities in response to declining pupil intakes and staff reductions. Multigrade schools offer small towns and villages an alternative to closing uneconomical single grade schools. Keeping village schools alive also helps to preserve the identity of the local communities.

Multigrade schools exist for many of the same reasons in developing countries. They are seen as an efficient means of providing quality educational services to rural areas. Multigrade schools fulfill an important role in improving access to primary education, and in maintaining services in light of budgetary and manpower constraints. There are, for example, approximately 420,000 multigrade schools in China, 20,000 in Indonesia, and 1,540 in Malaysia. Eight percent of schools in Philippines are multigrade; 61% of primary schools in India have only one or two teachers (UNESCO, 1989). Twenty-two percent of Mexican primary schools are "unitary" - offering all six grades but with only one teacher. Multigrade schools are also very common in the Pacific Island countries where small, isolated communities exist.

Multigrade schools have benefitted and continue to benefit from multilateral and bilateral support. The Bank has supported such schools in the Gambia, Mauritania, Lesotho, Botswana, Niger, Senegal, Guinea, Zaire, Mexico, Paraguay, Columbia and Brazil. SIDA has worked with multigrade schools in Zambia; UNESCO in Asia.

II. Rationale for Multigrade Teaching

What is multigrade teaching?

Multigrade teaching is generally taken to be a set of techniques that allow a teacher to deliver effective instruction to groups of pupils of various ages and capabilities. Miller (1989) identifies six areas essential for effective multigrade instruction: (a) instructional delivery and grouping; (b) self-directed learning; (c) planning and using peer tutoring; (d) classroom management and discipline; (e) classroom organization; and (f) instructional organization and curriculum. For Schiefelbein (1990), multigrade teaching is an "unassembled educational kit" used to improve the quality of basic education. Essential inputs are: a teacher prepared to act as a "FACILITATOR" of learning rather than a "source" of knowledge, group work, peer tutoring, effective teacher training, teacher resource centers, self-directed instructional textbooks and teachers' guides, learning corners, classroom libraries, appropriate classroom furniture, activities designed to enhance the relationship between the school and the community, a curriculum relevant to local needs and conditions, and modular evaluation and flexible promotion.

From the above, we can see that effective multigrade teaching involves much more than simply grouping more than one grade per teacher and classroom. Teacher quality and instructional delivery methods are at the core of multigrade teaching. This implies the need for a more rigorous preparation by the teacher of the learning process and a variety of different learning inputs adapted to the different learning modes: group, individual, peer-tutoring and class work. Critical inputs such as books, learning materials, classroom facilities and administrative support services help to support multigrade teachers.

> "Upon entering a school that works with the *escuela nueva* model, one notices that it functions in a distinct manner. Some children surround the visitors and ask them with confidence and interest what they have come to see; meanwhile others continue working, absorbed in their work. The teacher finishes giving some instructions to the group with which he is working and is able to talk with the visitors. Everyone seems to know exactly what he must do and if the visitor asks, they can tell him what they are doing and, more importantly, how they are learning; they know that they are learning with a method: they observe, they reflect, they write alone and then in a group, they compare their answers with those in the text, they correct and return to writing and finally, get comments and additional suggestions from the teacher, to whom they can go to anytime they have problems. Because in this school the teacher actually plays the role always recommended in the training colleges and institutes, but rarely put in practice, of being the facilitator of the learning process for the student."
>
> (Rojas and Castillo, 1988)

A good multigrade primary school should be efficient as well as effective: children should move through the basic curriculum as fast or faster than children in single grade schools, achieving competency in reading, writing, and basic arithmetic. Most importantly, multigrade schools use an inquiry approach to learning with realistic links to daily life. Children thus acquire a method for "learning how to learn."

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Why multigrade schools?

Multigrade schools may be used (a) to provide a complete primary educational cycle, or to expand access, in thinly populated rural areas; (b) to maintain educational services in small towns or villages with declining student intakes; (c) to make efficient use of scarce inputs; and (d) to improve the effectiveness of educational delivery. These factors are, of course, interrelated. Alternatives to multigrade schools include biennial or triennial intakes,[1] consolidation of small schools, or setting up a system of satellite and nucleus schools.

a. *To provide full educational services*, or to expand access, in thinly populated rural areas (see Annex I): alternative delivery techniques, such as multigrade schools, radio learning centers and mobile schools, can be used to make the last, most difficult, expansion in the coverage of basic education services to the remotest or more disadvantaged sections of the population. Innovative programs which provide educational services to difficult to reach populations are thus a crucial part of the drive to attain universal primary education. This is particularly true in countries where coverage may already be 90-95%, but also in countries where a large share of the population lives in areas which are thinly populated. Multigrade schools in remote rural areas also help to create opportunities for girls by expanding available school spaces, and by bringing schools closer to home.

   In multigrade schools, one or two teachers may offer a full primary cycle in schools with one, two or three classrooms. Enrollment in these schools usually varies between 10 to 100 (UNESCO, 1989). Such schools are found in such diverse environments as the rural areas of the United States and France, the mountain areas Pakistan, Peru's Amazon basin, the Pacific Islands, western China, rural Guinea and Zambia, and many of the Scandinavian countries.

b. *To maintain educational services* in small towns and villages with declining student intakes: because of declining populations many small towns and villages (particularly in the industrialized nations) no longer have a sufficient number of students to support single grade schools. Yet the school remains an important part of the social and cultural life of the town. Multigrade schools present an option to closing otherwise uneconomical single grade schools. The incidence of such multigrade schools is rising in most European countries. A recent survey of the Netherlands showed that 29% of all classes in primary schools were mixed age

[1] For instance, the FY 1989 Education Sector Restructuring Project in Mauritania proposes the use of multigrade teaching in areas where class size is below 35. The project would enlarge single grade schools and introduce multigrade teaching techniques so as to permit single grade schools to admit new pupils every year instead of every sixth year as is now the case.

classes (Veenman, et al, 1987). A similar survey in northwest England indicated that 66% of respondent schools had some kind of mixed age grouping (Bennett, et al., 1983).

c. *To make efficient use of scarce inputs*: multigrade classes may be used to maintain full educational services in light of budgetary and manpower constraints. Many school districts in the United States combine classrooms as a cost cutting measure. In countries where shortages of teachers or classroom space exist, multigrade teaching techniques can help assure that maximum use is made of these resources. For example, multigrade schools are being used in Zambia to upgrade services in rural communities which are too small and impoverished to provide self-help inputs needed for the construction and maintenance of complete schools. At the same time, multigrade schooling provides an opportunity to reallocate teacher resources from complete schools which can no longer attract sufficiently large numbers of students due to out migration in some areas (Lungwangwa, 1989). Multigrade schools promote efficiency by reducing repetition and dropout. In schools which have adopted modular curricula, there is no repetition as such. Students move through the curriculum at their own pace; typically as fast or faster than students in single grade classes. Slow learners in a multigrade system do not repeat entire grade levels, but only those aspects of the curriculum with which they have difficulty. A student may, for instance, do remedial work in mathematics while moving ahead in other subjects. Once he obtains a required level of competence in mathematics, he is fully re-integrated into the next highest class level. In a single grade school such a student may be forced to repeat an entire year's work.

d. *To improve the effectiveness of educational delivery*: multigrade teaching techniques have been used to improve the quality of education in both multigrade and single grade schools (see page 9). Ability grouping, peer tutoring, and self-directed learning are often used to address a broad array of learning patterns, to create a conducive learning environment, and to increase achievement in specific subject areas. For instance, Columbia's *Escuela Nueva* program was successful in raising primary students' achievement in math and Spanish, as well as positively affecting indicators of creativity, self-image, and socio-civic behavior (Rojas and Castillo, 1988). The program received wide publicity at the World Conference on Education for All in Jomtien, Thailand, and is now being studied for replication in Guatemala, Costa Rica, and Mexico. Multigrade teaching helped to improve achievement in mathematics and French in Togo and Burkina Faso (Jarousse and Mingat, 1991). Immersion language schools have also commonly use multigrade grouping and find it to be very beneficial.

In summary, a number of arguments have been presented in favor of multigrade schools. They are:

a. they are efficient means of providing basic education in thinly populated areas;

b. they are an efficient means of utilizing scarce educational inputs, such as trained teachers, classrooms, and materials;

c. evidence suggests multigrade students can attain higher achievement levels, especially in math, language and sciences;

d. maintaining rural schools is important in building village identity and cultural life;

e. multigrade schools can benefit girls by expanding available school spaces and by helping to ensure that schools are located closer to home;[2]

f. students "learn to learn" and "learn to teach" through independent inquiry and peer tutoring;

g. individual students and teachers develop a strong relationship over time, which helps the teacher assess the student and adopt appropriate teaching strategies;

h. students benefit from the unique multi-age and peer socialization patterns in multigrade classes; and

i. the stigma associated with repetition is removed.

The principal arguments against multigrade schools are:

a. student achievement may fall if programs are not supported by the required resources and teachers not properly trained;

b. demands on teachers' time and organizational capabilities are high; they need special training and materials to perform their jobs effectively; and

c. students may receive less individual attention, and must often work independently.

Multigrade schools are not the only means of addressing problems of expanding services to rural areas, maintaining schools in towns with declining populations, or managing scarce resources. Alternative policies include biennial or triennial intakes, closing or consolidating small schools, or setting up a network of satellite and nucleus schools.

Under a system of *biennial intakes*, students would be admitted once every second year. A six grade school would therefore have Grades 1, 3, and 5 one year; and two, four and six the next year. The school would always have three classes. For example, Table 1 shows the system of a biennial, six grade primary school. Each (+) indicates that the school has a class; each (-) indicates that the school has no class (Bray, 1987):

---

[2] Distance from school has been identified as a major factor in female enrollment. Evidence suggests that locating schools within walking distance of home helps to increase enrollment and retention of girls by addressing cultural concerns of parents and by lowering opportunity costs (King, 1990).

Table 1: Intake Patterns in a Biennial School

Year	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
1990	+	-	+	-	+	-
1991	-	+	-	+	-	+
1992	+	-	+	-	+	-
1993	-	+	-	+	-	+
1994	+	-	+	-	+	-
1995	-	+	-	+	-	+

A school with triennial intake system would operate in a similar fashion, but with intakes into Grade 1 only once every three years. It would have a maximum of two classes. Biennial and triennial systems pose certain added complications for teachers: they must deal with children of different ages and abilities in the classroom as well as change from one work program to another each year.

A second alternative to multigrade schools is to *consolidate small schools* into larger units. This would mean the closing of some small village schools. A Bank education project in the Gambia supports the consolidation of schools in rural areas where there has been uncontrolled development of primary schools, resulting in low average class sizes. The schools are being consolidated into larger units so that class sizes increase and teachers are used more efficiently. School closings are, however, often done at a considerable political cost. Closings also damage the social and cultural life of a village when not done with sufficient consensus.

A third alternative is to create a system of *satellite and nucleus schools*. This represents somewhat of a compromise with full scale multigrade schools. Individual villages or towns may retain either an incomplete grade school or a limited multigrade school for lower levels, say Grades 1-3; while older students, say Grades 4-6, attend a single grade school designed to serve the region as a whole. This central school should contain a good library and an extra meeting room where students can be brought for social and academic functions. Such a room is also useful for teachers meetings (see Chart 1).

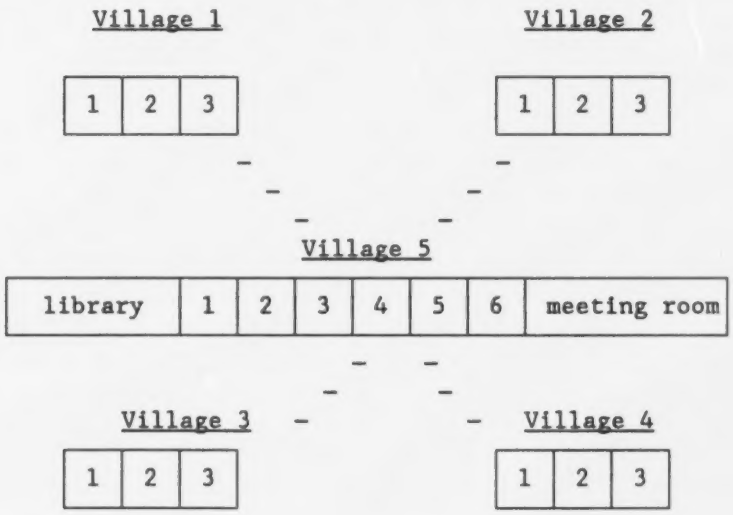
Important factors to keep in mind in determining the location of the schools in a nuclearization program are the geographic and demographic make up of the area, the desire to keep parents actively involved in the school, and the opportunity costs of sending students long distances to school. Planning for such a system is thus probably best accomplished at the local level, where detailed local information is available. Plans may be submitted to a higher authority for approval. Cruchet (1989) suggests that the distance to the central school not exceed four kilometers.

There are some hidden costs in this system which should be noted. First, there is an opportunity cost of sending children long distances to attend upper primary school classes, particularly if parents rely on these children for household help or labor. Second, the system makes it difficult for a village to have a "complete" school; and incomplete schools are a disincentive for parents to send their children to school. Third, a heavy burden is placed on the administrative network.

Honduras and Paraguay initiated educational nuclearization systems, in which rural schools are being organized into clusters of satellite schools with less than six grades, which receive management and support services form a central school with all six grades. Small satellite schools were expected to use multigrade teaching. The programs were designed as an alternative to building a complete six grade school in each village.

Evaluation of the nuclearization program in Paraguay revealed several unexpected implementation problems. The system overburdened nuclei directors, who in addition to serving as principals of the central schools, were to fulfill pedagogical and administrative functions throughout the system. However, they lacked the human and physical resources to manage the system effectively. Evaluators concluded that the costs of providing resources to make the nuclearization management function properly would be very high.

Chart 1: Nuclear and Satellite School System



Multigrade schooling appears to offer opportunities for greater political, social and economic efficiency in the delivery of educational services to rural areas. It avoids the political and social costs of school closure or consolidation, as well as the administrative costs of setting up networks of satellite and nuclear schools.

Moreover, access to a *complete* multigrade school located a *short distance* from home is an incentive for parents to enroll their children in school.

A study of multigrade schools in Togo and Burkina Faso concluded that such schools are a cost effective means of providing educational services. The research reveals a strong, positive effect on multigrade teaching practices on student achievement. The study also finds that the negative effects of large class size were more moderate in the multigrade setting than in the single grade setting. In fact, the benefits of multigrade instruction outweigh the negative effects of class size upwards to 100 and over. The authors conclude that multigrade teaching has financial and pedagogical advantages: multigrade programs may be used to maximize achievement at a given cost; or to minimize costs for a given level of achievement. Cost effective arguments hold even when accounting for increased construction and equipment costs associated with multigrade schools.

(Jarousse and Mingat, 1991)

Scope for cost savings

The potential for cost savings of implementing a multigrade program will have to be calculated for each particular country or region. The costs of implementing a program will, of course, vary by the existing level of materials and infrastructure development and by level of local expertise. Annex II lists several items to consider when costing multigrade programs. Note that many of the costs are associated with any school improvement program. At the same time, multigrade schools offer many opportunities for cost savings.

Among the most obvious costs of setting up a multigrade classroom are: furnishing and equipping the classroom, and providing self-learning materials and textbooks. Gains can be expected in terms of increased efficiency of the system resulting from lower repetition and dropout, and more efficient use of human and capital resources. It would not be unusual for expenditures in a multigrade school to result in higher costs per student but lower costs per graduate, thus resulting a *cost-efficient* option. The approach becomes *cost-effective* when it results in increased achievement.

Costs of Implementing the *Escuela Nueva* Program

Unit costs in the *escuela nueva* program are 5-10% higher than unit costs in traditional schools. Higher costs are mainly attributed to increased expenditure on textbooks and materials and teacher training.

However, repetition in *escuela nueva* schools is 6.7 percentage points lower than in traditional schools. And while dropout in first grade is slightly higher in escuela nueva, dropout in grades 2-5 is on the average 7.6% points lower than in traditional schools. The results are all the more astonishing when one takes into consideration that children attending *escuela nueva* schools are generally at higher risk of repetition and dropout than children attending traditional schools.

Teaching methods used in *escuela nueva* have also resulted in significantly higher achievement in mathematics, Spanish, and social-civic behavior.

These factors combine to make the *escuela nueva* model a cost-effective option for provision of educational services in Colombia.

(Schiefelbein, 1991)

Student achievement

Multigrade schools are an *efficient* means of providing educational services to difficult to reach populations. Evidence shows that they can also be an *effective* means of delivering services. Perceptions of multigrade schooling in developed and developing countries, however, often differ. The developed country

view tends to be positive: throughout the twentieth century multigrade schools have been regarded as an effective means of providing quality educational services to rural areas of Europe and North America. Multigrade teaching techniques are powerful pedagogical tools which promote independent learning; mixed age classes promote good socialization patterns.

With some exceptions, the developing country view of multigrade schools tends to be negative. They are seen as a second class solution, made necessary by resource constraints and adverse demographic conditions. They are seen as a temporary solution, a intermediate point on the route to a "full" primary school offering all grades in individual groups, each with its own room and teacher. Through force of circumstances, many developing countries have adopted the organizational pattern, timetable, and student groupings used in multigrade schools, but do not practice the modified pedagogical techniques needed for successful multigrade schooling. Rather, they assume that a teacher familiar with instructing a single grade class group can function successfully without additional training in the pedagogical aspects which are essential for effective multigrade instruction -- self-directed learning, peer tutoring, careful lesson planning, variation in methods of instructional delivery, and appropriate texts. In doing so, they create "quasi" multigrade schools with limited chances of success.

Studies have shown that students can benefit from multigrade programs when they are properly implemented. Such programs offer unique opportunities for increased achievement and improved socialization patterns. More importantly, multigrade teaching techniques foster skills in self-learning which benefit the student throughout his or her life. Multigrade programs, however, require special efforts to implement. Teachers must possess an array of pedagogical techniques, be well trained and conscientious. They must have a minimum package of teaching and learning materials at their disposal, and be supported at the regional and national levels. Schools which fail in these respects have diminished chances of success.

Studies conducted in North America and Europe to assess the effect of multigrade instruction on student achievement generally show no significant differences between students in multigrade and single grade classes (Veeman, 1987; Noonan and Hallak, 1987). Multigrade students in Britain, Germany, the Netherlands, Switzerland and the United States perform as well as their single grade counterparts in all major subject areas.

Studies from the developing world show generally positive, but mixed results from multigrade programs. Togolese and Burkinabe multigrade students performed substantially better than single grade students. This was attributed to the effects of peer tutoring, independent work, and the variety of presentation methods typically found in multigrade classrooms. Multigrade classes forced teachers and students to use alternative teaching and learning approaches, breaking the tradition of rote memorization and repetition which often characterizes learning in developing countries. In fact, the beneficial effects of multigrade teaching techniques even outweighed the negative effects of larger class size found in Togolese and Burkinabe multigrade schools (Jarousse and Mingat, 1991). Harbison (1988) also reports positive results from multigrade experiments in northeast Brazil. He emphasizes the positive effects of peer tutoring and of repetition of material, especially

in schools where inputs are scarce, and students are often absent due to illness and the need to work at home.

Experiments with the unitary school in Latin America in the 1970s yielded positive results. They led to the development of the successful quality enhancing programs such as *Escuela Nueva* in Columbia, and helped to dramatically increase access to primary education in rural areas. The program offers solid evidence that multigrade schools can work well: students enrolled in *Escuela Nueva* schools attained higher achievement levels than students in comparable single grade schools in math and Spanish, and demonstrated higher levels of self-esteem and better social-civic behavior patterns (Rojas and Castillo, 1988). The participatory atmosphere in the schools was particularly helpful in improving girls' self-esteem (Colbert, 1991). *Escuela Nueva* was most successful where teachers were committed, parents were involved in the educational process, and sufficient resources were available.

A study of learning achievement in Togo revealed that the effects of multigrade schools was to raise students achievement scores by an average of 7.2 points, controlling for other personnel and institutional factors. The benefit from multigrade teaching was found to even outweigh the negative effects of larger class size typically associated with multigrade schools. The researchers attribute the increase in achievement to two factors which form an integral part of good multigrade teaching practices: (1) independent learning by the students, (2) peer tutoring, and (3) a greater variety in teaching delivery methods.

(Jarousse and Mingat)

A recent study of effective teaching practices in Pakistan found that students in multigrade schools typically score 30% lower on achievement tests than their counterparts in single grade schools. Teachers in these multigrade schools, however, adopted few of the techniques commonly associated with multigrade teaching - independent learning, peer tutoring, strict lesson planning and scheduling. They had few teaching and learning materials at their disposal. Teachers relied heavily on rote memorization and lecture, the same methods used in single grade schools. While the teacher worked with one grade, the others sat idle. The result was that time on task was reduced, teachers became frustrated, and student achievement fell.

(Rugh, 1989)

Non-graded schools in India were successful in decreasing dropout rates and increasing achievement (Chickermane, 1981). And limited experiments with multigrade schools in Zambia were reported to be partially successful, especially as measured in terms improving student progression from grades four to five. (Lungwangwa, 1989). Indeed, the most important achievement of the multigrade experiment in Zambia was the provision of a full primary school cycle in previously underserved communities.

In contrast to the cases presented above, multigrade students in Pakistan performed 30% worse on achievement tests than their single grade counterparts. Multigrade teachers there, however, adopted few effective teaching practices generally associated successful schools in Pakistan and with multigrade schools elsewhere (Rugh, 1989). Likewise, multigrade schools in Mexico generally showed higher rates of repetition and dropout. The least efficient of all were schools in which materials and facilities were lacking and teachers were poorly trained. One lesson that may be drawn from these cases is that it is difficult to implement an effective multigrade program without trained teachers and sufficient material inputs.

Although somewhat scanty, the evidence emerging from the developed and developing worlds leads to the conclusion that multigrade schools are just as effective as single grade schools in educating students. In

some cases, students have attained higher levels of achievement in academic subjects as well as in social-civic indicators than their single grade counterparts. Peer tutoring, repetition, self-learning, and improved opportunities for socialization are important ingredients for success. More importantly, students in multigrade classes "learn to learn."

One may conclude that when programs are correctly implemented, students may attain higher achievement levels and improved social skills. But students in multigrade schools which fail to adopt effective pedagogical techniques tend not to perform as well as their counterparts in single grade schools. The lesson to be drawn from this is that in order for a multigrade school to work well teachers must master and use effective teaching practices, be supported through training programs, and have appropriate texts and materials at their disposal.

III. Effective Teaching Practices: The Process

Effective teaching practices form the core of multigrade programs. This section presents a review of such practices; the sections that follow review the consequences for the classroom, regional and national levels. Many of the topics covered in this section are in fact relevant for both single grade and multigrade schools. What must be stressed, however, is that learning in multigrade schools will be handicapped unless these techniques are used.

International research has identified the following as effective teaching practices: careful lesson preparation, peer tutoring, self-directed learning, creation of a conducive learning environment, and frequent assessment and feedback. Of course, effective practices may vary by culture, subject matter being taught, classroom conditions and teacher personality. Effective teachers are likely to use a variety of delivery approaches because such practices are synergistic.

As for managing the classroom, there are two options available to the multigrade teacher. Choice will depend most importantly on available learning materials, but also on teacher ability and cultural acceptability. The first approach stresses the role of the teacher as a "leader" of the learning process. Emphasis is put on lesson preparation and delivery, scheduling, and directed learning. This approach puts high demands on teachers' time and organizational abilities.

The second approach establishes the student as "leader" of the learning process. In this system, the student moves through a set of self-learning materials at his/her own pace, assisted by the teacher and peer tutors. The teacher's responsibility is to create a conducive learning environment, construct effective student learning groups, promote peer tutoring, and provide special guidance and directed lessons where necessary.

Lesson preparation

Teaching more than one grade level at a time can be a demanding and challenging task. The teacher must see to it that each grade covers its required syllabus, that actual time spent learning (time on task) is maximized, and that material is presented in a logical, sequenced and effective fashion. Teachers must effectively distribute their time between groups and teaching methods. Good lesson preparation/planning is therefore even more essential than for single grade teachers. It helps ensure that the message is clear, delivery is efficient and effective, a variety of teaching techniques are employed, and the best available materials are used. Many of the challenges posed by multigrade teaching can be met by: (a) attention to rational organization, (b) a constant rigor in carrying out activities, (c) strict time management, and (d) absolute respect for the syllabus/curriculum (Cruchet, 1989). Teachers establish themselves as MANAGERS of the learning process by developing and using lesson plans.

In a well run multigrade class, groups of students will be engaged in various learning activities throughout the day. Apart from scheduled breaks and transition periods, there should be very little "down time." This means that the teacher will have to employ a variety of delivery methods, in a systematic, logical sequence. One such sequence includes review, preliminary statements which focus student attention, presentation of new materials, guided practice, independent practice, and adding practice with homework (Rugh, 1989). Effective teachers tend to use a more complete set of these behaviors than less effective teachers. Use of a single approach or practice, no matter how constructive in itself, does not appear to be as useful as introducing a package which contains as many of the key elements as possible (Rugh, 1989).

The need for careful planning cannot be overemphasized. Attention needs to be paid to allocating sufficient time to achieve objectives set forth in the curriculum, to dividing teacher time among student groups, and to maximizing student time on task through lesson coordination and variety in delivery methods. The following diagram may help one appreciate the demands placed on multigrade teachers. It may be useful for teachers to use such diagrams to help plan their schedules (Cruchet, 1989):

Activities Plan

<table>
<tr><th>Time</th><th>Grade 1</th><th>Grade 2</th><th>Grade 3</th></tr>
<tr><td>15 min</td><td colspan="3">Common activities with three sections (singing, news, health)
X</td></tr>
<tr><td rowspan="3">45 min</td><td rowspan="3">X
Self-study/application of concepts learned in homework
X</td><td>Group presentation (english)
X</td><td></td></tr>
<tr><td>Practice exercises</td><td>More presentation
X (english)</td></tr>
<tr><td>Review and checking
X</td><td>Exercises/review
X</td></tr>
<tr><td rowspan="2">45 min</td><td>New lesson (math)
X</td><td>Written exercises</td><td>Research activity in learning corner</td></tr>
<tr><td>Related exercises</td><td>Checking/new lesson
X (math)</td><td>Exercises/checking
X</td></tr>
<tr><td>15 min</td><td colspan="3">Synthesis/introduce new common activity (gardening)
X</td></tr>
</table>

X - position of teacher

Teachers should ask themselves the following questions when preparing their timetables (Collingwood):

a. Do they give enough time to language and mathematics?

b. Is the balance of work between class groups correct?

c. Are the lessons too long, too short, or just right (think of the age and maturity of the children)?

d. Are all the necessary subjects properly covered?

Multigrade teaching forces teachers to vary their delivery methods. Teachers must address multi-level groups and sub-groups, provide individual instruction, and remedial tasks. They must also be able to organize students for self-instruction (see page 20). The need to vary delivery techniques forces teachers away from an over reliance on rote methods. Choice of delivery technique will depend on the subject matter being taught, and the personality of the individual teacher and class. Among the various techniques:

a. *Subject staggering option* - subjects which require more teacher-pupil interaction are grouped with subjects requiring less. For example, the teacher works intensively with one grade on math, while another grade does creative arts. Different activities are assigned to different grades.

b. *Subject grouping option* - subjects which easily lend themselves to vertical integration are presented by the teacher to all grades at the same time, e.g. music, art, drama, social studies, environmental studies, religious education and physical education.

c. *Common timetable option* - the same subject is presented to all grades in a given timetable period. The subject is presented to each group according to the prescribed grade level and the work program designed by the teacher. Length and difficulty of work assigned are a function of age and level of the students. Such arrangements are conducive to teaching same ability groups subjects such as language (reading, writing, spelling) and mathematics. Older students may be assigned relatively more independent work, allowing the teacher to spend more time teaching younger students when a new concept is being introduced.

d. *Integrated day option* - this is a non-timetable approach. The pupil is considered to be an independent learner who is at liberty to make a choice as to what subject to study and when. The option was used in a number of experimental programs in the 1960s and 1970s. The approach is very difficult to implement in large classes because it demands a lot of individual student-pupil interaction.

To produce an effective multigrade teacher is a matter of national teacher training policy, which will be discussed in the section titled "Consequences for National Policy."

Self-directed learning

Students in a multigrade class must learn to work independently part of the time. Assigning independent work to a subgroup allows teachers to work individually with pupils or with another subgroup. It also helps students to develop skills for "learning how to learn" which will be valuable throughout their lives. To be productive on their own, students must have access to materials; e.g. self-teaching guides, exercises prepared by the teacher, and a library. The materials should allow students to conduct research or proceed through self-correcting exercises with minimal guidance from a teacher.

Peer tutoring

Having students serve as teachers within and across grade levels can be a very effective tool for learning, and is an essential part of multigrade teaching. Peer tutoring may occur in an incidental and casual fashion, or in a structured setting. Research on incidental peer tutoring in the multigrade context is non-existent, but research on structured tutoring programs is abundant and overwhelmingly positive. It appears to be most effective under the following conditions:

a. where it is implemented in a structured program;

b. when it is of shorter (0-4 weeks) duration. When tutoring continues beyond four weeks, there is a diminishing return;

c. where lower level skills are being taught and tested; and

d. in math, followed by reading (Miller, 1989).

Peer tutoring benefits both tutors and learners, and serves as a powerful tool for extending the influence of the teacher in the classroom. Tutoring programs help to re-enforce and encourage a deeper understanding of subject matter, to create positive attitudes toward subjects, and to foster a productive learning

Peer Tutoring

According to Miller (1989), peer tutoring need not be planned but is part of a good teacher's arsenal of methods to help students. Successful multigrade teachers have learned through experience to capitalize on the capabilities of their students to help one another. Miller offers seven possible uses for incidental peer tutoring: (1) drill each other in math, spelling, etc.; (2) help other students develop a skill that the tutor possesses; (3) build self-esteem of the tutor; (4) peer modeling in skills such as pushups, song, dance, etc.; (5) ask a student to explain a concept in "kid language"; (6) let a student (or group) teach a chapter in social studies; and (7) help each other with study skills and researching.

He offers the fictitious student named Joe as an example: English is Joe's first subject of the day. The class has been assigned to learn the definition of a noun and write 10 examples. Joe confuses nouns and verbs so Amy has been assigned to go outside with Joe and gather 10 things that are nouns. She is to demonstrate, for example, why he cannot pick up a "jump" or a "run," but that rocks and sticks are objects, and therefore, nouns. Next is math. Joe is struggling with simple addition. He and Bob are going to a quiet corner with a container of bottle caps. Using these concrete objects, Bob will demonstrate simple addition to Joe, then assist Joe in working his own problems. The next opportunity for peer tutoring for Joe in P.E., but with the roles reversed. A young student is having difficulty doing proper pushups, an exercise Joe is very good at. Joe is asked to demonstrate a proper pushup, then offer tips in helping the younger students. Joe's self-esteem is really boosted by being the "teacher" and he takes his task very seriously. During spelling, the class is divided into pairs for an individualized spelling program. Joe quizzes his partner on his word list. The words are checked for spelling errors, then the roles are reversed.

environment. Structured tutoring programs may be looked at as a logical extension of the natural process by which students already learn from one another. Unfortunately, many teachers still equivocate student collaboration with cheating, but it is a valuable pedagogical tool which should be viewed in a more positive sense. Peer tutoring enriches the educational experience for fast learners while providing slower learners with the extra attention and resources to help them succeed.

Peer evaluation can be a useful jumping off point for peer tutoring. According to this technique, students are paired and asked to correct one another's assignments or examinations. The correcting student reviews the work with the other student, pointing out errors and discussing answers.

Perceptions of Student Collaboration

Some teachers view student collaboration as beneficial and encourage it, while others view it as cheating and discourage it. The difference in outcomes may be seen in an example of a group of students assigned to solve a set of math problems. In the former teacher's class, students in the group discuss the problems, offer solutions, and help those that do not understand clearly. Some students are heard asking questions and others explaining the logic they used to solve the problems. The atmosphere is lively and stimulating, and students move through their work quickly.

In the latter teacher's class each student in the group works independently. Speaking is forbidden. In this sense, the "group" does not function as such; it is more accurately described as a collection of individuals. The students take longer to solve the problems. Some are frustrated and give up. Others solve the problems, but are confused on some points and struggle to clearly articulate their logic when asked by the teacher to do so before the class. On the whole, these students have more difficulty in applying their knowledge to real world problems and have a lower pass rate on their exams.

Creation of a conducive learning environment

Creation of an environment conducive to learning is crucial for multigrade schools. Detailed definition of such an environment will of course vary by culture, but for the purpose of this paper it can generally taken to be one in which learning can proceed without distractions and interruptions. Classroom discipline should not pose special problems in multigrade classes provided that students know the rules and know what is expected of them. Careful scheduling to keep students occupied, and development of a "routine" so that students know what to expect and when will help to create an orderly classroom environment. Responsibility for the learning environment is therefore on the *teacher* and is mainly solved through detailed lesson preparation, materials and curricula organization. Where the teacher has well prepared lessons which are tailored to the students' capacities, few discipline problems will result. Keeping students meaningfully occupied takes quite a bit of teacher imagination in designing activities and exercises, especially when materials are in short supply.

Frequent assessment and feedback

A conscious effort must be made to ensure that students receive adequate assessment and feedback on a regular basis, particularly in large classes where the teacher is a scarce resource. Students in such classes are

easily isolated without constant feedback. Given the large percentage of self-learning in multigrade classes, teachers should be especially diligent about checking for "mastery" of work completed, before the pupil proceeds to the next module. Hence, the importance of regular assessment. Student progress may be recorded on a wall chart or in a record book managed by students themselves. This allows students to see their own progress and teachers to direct remedial work.

To summarize, effective teaching practices for multigrade classes require teachers to redefine their role. Multigrade teachers act as MANAGERS of the learning process and as RESOURCE PEOPLE. Teachers should therefore have a sound grasp of core subject matter and then be able to direct the student or group on how to find answers. They must be familiar with the school or class library and how to use it; be able to take advantage of other resources within the school or community; and be possess an array of teaching and learning approaches.

Cultural Dimensions of Learning: Classroom Environments Around the World

In Pakistan, an effective learning environment is generally taken to be one in which students are quiet, attentive, and absorbing what the teacher saying. In a multigrade class students who are not being addressed are expected to sit quietly and respectfully as they await their turn with the teacher.

In Sierra Leone, emphasis is put on students being neatly dressed, equipped with their notebooks or slates, and acting in unison. They may be singing together, or reciting multiplication tables together. Participation in class activities is high, but strictly controlled by the teacher.

In Colombia, groups of students in a single classroom may each be pursuing separate activities. Students should be focused on their tasks, unaffected by other groups work or the teacher movement about the classroom.

In Hawaii, students may all be speaking at once - reading aloud, asking questions, offering answers. It may seem confusing to the casual observer, but not to the students who enjoy learning through constant, lively "give and take."

Effective multigrade teaching practices are applicable in single grade classes as well. For example, countries which advocate automatic promotion from first grade may use multigrade techniques to work with second grade students that would have otherwise been held back in the first grade. The idea would be to create a temporary remedial group which would work more or less independently of the main group. Once the remedial group has achieved mastery, it is reintegrated into the main group. Self-instruction and peer tutoring are also useful in the single grade classroom where students display a range of learning abilities, styles and pace. Of course, careful lesson planning is useful for any class arrangement.

IV. Consequences for the Immediate Environment: the Classroom

Given the process of multigrade teaching, we now turn to the consequences that such a process has for the immediate learning environment: the classroom. This section examines some of the particular classroom and school level issues that pertain to multigrade schools.

A teacher who has a variety of learning materials at his or her disposal, and who can differentiate ability groups and guide students in finding answers to their questions acts as a FACILITATOR of the learning process. Teachers must have multiple sources of knowledge at their disposal to run mixed ability programs - a diverse library, adapted learning materials, and possibly a radio. The layout of the classroom should be conducive to teaching several groups. Sufficient space to allow separation of groups, mobile furniture, and blackboards on opposite walls will help to achieve this task.

There are many general guidelines but few firm answers on how multigrade classrooms are best organized. The important thing to keep in mind is to provide sufficient space and materials to allow for group work, teacher movement, maintenance of an orderly environment. Answers to questions such as what is the optimal combination of grades, the number of grades per class group, children per classroom, or space per child are likely to vary by culture, teacher ability, and available resources.

The classroom/school library

Availability of adapted teaching materials is of even more importance in a multigrade school than a single grade school (Cruchet, 1989). Multigrade classes must have access to a small library which contains enrichment and remedial materials. This allows the teacher to run a mixed ability program - breaking children down into ability groups and directing them in a self-learning process. With appropriate books and materials, the teacher may direct one group of children to work independently, while providing more intensive instruction to another group.

Libraries in Colombia's *Escuela Nueva* (New School) Program.

"The school library is organized with general reference material, dictionaries, textbooks for curricular areas, children's literature, and books on rural community development topics. Complementing the study guides and learning centers, the library is essential for providing active learning and "learning to learn" attitudes. Children learn to organize their library. A library committee of the school government is in charge of lending the books and taking care of them. Activities are organized throughout the school year to promote the school library as a center for cultural participation of the community."

"Providing one library per school, with approximately 100 volumes, at a cost of only US$ 225 is practical and financially feasible for the Government, which can acquire textbooks already available through private publishing companies. The New School materials and strategy, emphasizing study guides and libraries, have given the Colombian government a tool for furnishing rural schools with educational materials published by the Nation, as well as texts acquired from the private sector." (Colbert, 1991)

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Learning materials

The complicated task of teaching multigrade classes is facilitated by good learning materials: self-directing books and exercises. These materials are crucial for the success of multigrade classes. Textbook development and supply is normally dealt with at the national level (see page 29). Simple duplicating technologies will help the teacher prepare self-learning materials. This need not be an expensive mimeograph machine, as the number of required copies is normally quite low. Photocopies, or in remote areas without electricity, simple alcohol "ditto" sheets serve equally well. Most classroom needs can be met with such simple technologies (see Annex III). The corollary here is the need for a regular adequate supply of consumable materials, such as paper and ink.

Radio instruction

A radio could become a valuable source of learning where educational broadcasts are available, although distance learning techniques and their delivery are beyond the scope of this paper. Radio has been used in Nicaragua to teach mathematics, and in Kenya, Jamaica, Botswana and Ethiopia to reach pupils as well as to help train teachers.

Layout of the classroom

There are many ways by which layout of the classroom can facilitate multigrade teaching. Learning corners facilitate multigrade teaching by providing semi-private spaces for groups of students to work. For instance, one corner may be set aside for geography or science lessons, another for reading and yet another for "practical" type activities (cutting/pasting, coloring, modelling, simple experiments, etc.). Each corner would contain a range of materials designed to accommodate several grade levels.

Blackboards on opposite walls permit the teacher flexibility in arranging and moving about the classroom. They also permit the teacher to designate a particular blackboard or display area for a particular sub-group. Flexible furniture, tables and chairs or small benches, or desks of a standard size which may be put together to form a larger working space will facilitate group learning. The more mobile the furniture is, the more flexibility the teacher will have in arranging it to suit particular needs.

Of course, classrooms should also be equipped with display boards, shelves and/or lockable storage cabinets for books. Consideration should also be given to lighting and ventilation in multigrade classes to attempt, as much as possible, to avoid seating students in direct sunlight or in inadequately lighted areas.

In a multigrade class, it is necessary to ensure a generous surface area per pupil to allow separation of sections, creation of "activity or learning" corners, and easy circulation for the teacher and students. Cruchet

(1989) suggests that planners count on an average of 1.2 to 1.4 square meters per student. Others suggest 1.5 square meters per student.

Characteristics of the class group

Students may be grouped in a number of ways for the purpose of learning (Collingwood):

a. *Same ability group*: students are grouped in advanced, average, and low ability groups across the age range. This permits students to work together at more or less the same pace, to be given the same learning materials and the same tasks. It is particularly useful in subjects such as mathematics and language.

b. *Mixed ability group*: the group consists of students with a range of ages and abilities, representing a variety of skills and strengths. Such groups are particularly useful for project work, where the teacher involves students in a theme which cuts across many subject barriers. Mixed ability groups often benefit less able, less confident children by giving them the opportunity to participate based on their own particular strengths.

c. *Same age/year group*: students are grouped by age or class year, e.g. class one and two. Such a grouping makes it easy to work with the graded textbooks, normally the only ones available in developing countries. But it presents problems for the teachers because they are faced with a range of abilities within each group.

d. *Social group*: grouping is based on the compatibility of children. Such a group promotes a non-competitive, harmonious learning environment useful for building self-confidence in weaker students.

Children gain from changing groups from time to time. Good multigrade teachers will use a variety of groups and methods to meet children's needs. Thus both method (see page 14) and grouping will vary by subject area, student ability and teacher talent.

Classes may therefore be made up of any *combination of grades* e.g. 1,2,3 and 4,5,6; 1,3,5 and 2,4,6; 1,4 and 2,5 and 3,6; or 1,2 and 3,4 and 5,6. Most staff find it easier to teach consecutive grades, because the range of ages and abilities is smaller, providing more opportunity for combined activities. This is the most common arrangement. There may, however, be reasons for using other grade combinations:

a. to form classes of roughly equal size;

b. to keep some pupils together for several years;

c. to place well behaved pupils together, so that another group less well behaved pupils can be supervised more easily;

d. to maintain student-teacher relationships over several consecutive years; or

e. to group grades which need more teacher attention (especially grade one, but also the final grade in countries where students sit end-of-cycle examinations) with grades which can work more independently.

Headmasters have to decide how to best combine their classes to make the most efficient use of the teachers available. They must take into account total numbers, trends in future enrollments, level of training and competence of individual teachers. Regional education officers should be prepared to offer guidance in this area.

The number of *grades per class group* will depend on factors such as available resources and actual enrollment in each grade. A general rule is that multigrade teaching should be used to the extent that a school is incomplete. That is, if the goal is to provide the full primary education cycle of reasonable quality, and availability of trained teachers is one of the chief constraints (because there is a shortage, because of the government's inability to pay teacher salaries, or simply because the number of children living within a reasonable walking distance from the school is too low to warrant a full-fledged primary school), then all efforts have to be made to ensure that teachers are used efficiently. Providing teachers with the skills to teach multigrade classes is an effective means of attaining the goal. Two or three teachers may be able to provide a small primary school with a full six grade curriculum. It is difficult for a single teacher to handle more than two or three grades unless the method of biennial (or even triennial) intake is combined with multigrade teaching.

The *size of the class group* depends on cultural conditions, resource availability and teacher talent. Again, in a limited resource situation, some trade off must be made between quality and the drive for universal education. Cruchet (1989) suggests class size should be between 40 and 60 students. Other experts say 30-40 is the maximum possible with four grade levels. Research in Togo and Burkina Faso, however, points out that the negative effects of larger class size are moderated in the multigrade classroom (Jarousse and Mingat, 1991). This leads to the conclusion that multigrade teaching techniques make it possible to maintain quality while increasing average class size. In short, there is no conclusive evidence on the subject of ideal class size. An administrative rule of thumb that has evolved in France is that if N is the number of students in an effective single grade class, N x 4/5 is suitable for a two grade class, and N x 3/4 for a three grade class.

V. Consequences for Local/Regional Level Administration and Support

Even well trained and motivated teachers with a wealth of multigrade teaching experience and a well furnished and equipped classroom will require support in administration and pedagogy. Pedagogical advisors should be able to help the teacher develop a repertoire of instructional methods and materials. While important for all teachers, pedagogical support is especially important for those teaching in multigrade schools because many such schools are located in remote or isolated areas, which brings about the danger of teacher isolation and contributes to outdated and old fashioned delivery methods and content. To counteract such tendencies, teachers in isolated areas should have a central meeting place where they can exchange ideas and experiences, collect resources, and maintain professional contacts. District supervisors or inspectors have regulatory role to fulfill in ensuring the smooth functioning of the school, but should not neglect their pedagogical support duties. Rural schools must be supported through an effective administrative network which ensures that books and supplies are delivered and teachers salaries are paid. These goals are probably best achieved through a decentralized school system. Communities are also an important source of support for rural schools; school-community relations therefore form the final issue to be examined in this section.

Pedagogical support

Pedagogical advisors at the regional level are supposed to serve as resource people for teachers, providing individual guidance and training in instructional methods and introducing new teaching materials. Training for pedagogical advisors in multigrade techniques is essential for implementing programs. For example, the work of dedicated, mid-level staff was considered a key element in the success of multigrade schools in Colombia. Advisors must have access to transportation in order to visit schools in their districts regularly. Annex IV presents a sample format for a pedagogical workshop designed to train both teachers and supervisors.

Teacher Journals

The Canadian Organization for Development through Education (CODE) supports the development of a professional journal for teachers in Mali. The journal, titled *Contact Bulletin Pedagogique*, is designed to serve as a means of disseminating current issues in education, create a sense of teacher professionalism and to combat isolation of rural teachers. The journal is published on a quarterly basis and contains general news of the education sector, readings in pedagogy, stories and official notices.

Regional education officers should consider development of regional resource centers which would serve as a place for multigrade teachers to meet, interact, and share experiences. Such a center would help to combat the inherent professional isolation of multigrade schools in rural areas, where opportunities for social and professional growth may be limited. Resource centers could be created in a centrally located school. A newsletter or radio program can often be used to create a sense of belonging in the education community.

Supervision

In many school districts, the roles of administrative supervisor and pedagogical advisor are played by the same person, such as the district school inspector. These are, however, two distinct responsibilities with an inherent conflict. The supervisor/inspector is often trained more in administration and inspection, but hardly at all in pedagogical support. Hence, his administrative role tends to dominate his advisory role. Supervisors are important in helping to ensure that student and teacher attendance criteria are satisfied and that physical, financial and administrative standards are met; this is true for multigrade schools as well. But the supervisor/ inspector should be careful not loose track of his role as pedagogical advisor and resource person.[3]

Administrative support

Rural schools districts are frequently plagued with problems of administrative support. As most multigrade schools are in sparsely populated rural areas, multigrade teachers are on average affected more severely by lack of such support than other teachers. Teachers must take off days each month to collect their paychecks; books and materials are often not delivered to far flung schools (or at best, not delivered on time); schools fall into disrepair because maintenance crews do not reach them. The burden of these tasks should not be allowed to fall on the teacher; hence there are managerial and administrative consequences for the local education offices. Development of a system of rural schools must be accompanied by a parallel development of the administrative network needed to support them.

Decentralization

A decentralized educational system lends itself to building effective multigrade schools. Such a system encourages teachers and local education officers to actively participate in managing schools, developing learning materials, and in making decisions regarding curriculum and pedagogical methods. In short, it fosters independent learning and development of decision making skills in teachers and local administrators - the same skills teachers try to foster in their students. Decentralization also helps to break down systems of rigid control and to build trust between central and local personnel. It helps to assure that the particular needs of individual schools and teachers are satisfied. Effective decentralization, however, requires a proper set of incentives and a system of accountability.

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[3] For ways to balance supervisory and pedagogical support roles, see: Higgenson, Peter and Kevin Laws. "Standardized Appraisal Manual." UNDP/UNESCO Project Ras/86/053 Pacific Educational Management Combined Zone Workshop, UNESCO Office for the Pacific States, 1989.

School-community relations

Managing school-community relations in rural areas can be challenging. In some cultures, teachers find themselves playing many different roles - as school administrator, community resource person, and translator. For some communities, teachers are the principle link to the outside world. They translate letters, initiate small development projects, and sit on local advisory committees. At the same time, teachers may be looked upon as outsiders, or with suspicion. The community is likely a large contributor of resources to the school; wants to be involved in the management of the school; and has a higher sense of ownership, particularly if the school was built through self-help efforts.

Although these issues pertain to rural schools in general, multigrade teachers should be especially aware of them because their schools are often located in the smallest villages and most remote rural areas. Multigrade teachers should feel comfortable in such an environment. This has consequences for teacher training and particularly the period of practical experience which will be elaborated in the next section. Cruchet (1989) feels that having a well trained teacher who is also well adapted to the physical, social and economic environment in rural communities is important for raising the demand for schooling. Teachers, he says, must not only be competent in fulfilling their pedagogical roles, but in fulfilling a role as community animator.

Multigrade schools in rural India are attempting to foster closer school-community relations by providing teachers with training in the particular culture and problems of areas to which they are assigned. They have also experimented with restructuring the curriculum to make it more relevant to daily life, and involving community members in the school program (UNESCO, 1981).

Programs which involve parents as teaching aides, or recent local school graduates as teaching assistants, can also help to break down barriers between the school and the community. This is important in removing the cultural barriers, which are often found in rural traditional societies, to expanded girls' attendance in schools. Where parents not only visit the school, but often participate in the social and learning activities, mistrust of the school is often eliminated.

School-Community Relations in Zambia

A recent study of multigrade schools in Zambia (Lungwangwa, 1989) demonstrated many benefits of strong school-community relations. Communities with active, viable parent-teacher associations demonstrated a clear willingness to tackle the problems of school development. In three of four rural schools studied PTAs raised significant contributions in-kind and in cash to construct classroom blocks, teachers houses and latrines. (The other community studied was too poor to contribute significantly to the school.) PTAs also tackled such problems as high student-teacher ratios, female dropout rates, and provision of supplies. Productive school community relations meant that parents became actively involved in the development of the school -- not only in the construction and maintenance of the physical infrastructure, but in issues of quality and attitudes towards education. In doing so, they helped to tackle some of the most critical issues in educational development today.

There is also a positive role for teaching assistants in helping to manage classes and lighten the workload of multigrade teachers. Voluntary help can provide teachers with extra time to work with remedial groups or individuals. Volunteers also gain a sense of pride and achievement from their work. Successful

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Escuela Nueva schools in Colombia have managed to involve community members not only in providing resources for schools, but in the learning and teaching processes. School libraries, for instance, contain materials of interest to the community as a whole. Farmers, masons, businessmen, or the local doctor may be brought in as guest speakers. Mothers may work as class monitors or teaching assistants.

VI. Consequences for National Policy

There are two stages in implementing multigrade training programs. The first is an "experimentation" phase in which national level authorities take few actions other than allowing pilot projects to proceed, and supplying necessary financial and human resources. Pilot multigrade schools are established, made to function well, and used as bases for expansion. In this stage, teachers and local administrators in pilot schools are deeply involved in designing materials and adapting teaching methods. As the pilot schools begin to function well, and interest in the model builds, an experiential training program is established, using the pilot schools as training centers. Participation in the training program is voluntary, and the innovation spreads based on interest generated by successful schools and teachers training teachers. It is helpful to have a few key people from the national level involved in the pilot program. This provides a sense of program "ownership" and helps to build a core group of multigrade advocates.

The second stage is "expansion" of multigrade school practices to other areas of the country with the potential to benefit from multigrade school systems (see page 3). It is at this stage that national policy level decisions with regard to:

a. creation of a decentralized administrative framework;

b. provision of teacher training in multigrade techniques;

c. a clear policy on the recruitment and support of multigrade teachers;

d. acceptance of a flexible curriculum open to regional or local adaptation; and

e. development and allocation of training materials to multigrade schools;

The most important of these actions is teacher training and materials development and allocation. For use of effective teaching practices is the single most important factor in developing a successful multigrade program. Such practices are applicable in single grade classes as well and should therefore be introduced in the general teaching training curriculum. Multigrade teaching is enhanced through the development and provision of textbooks, teaching materials and curricula aimed at independent learning. Special efforts may be necessary to encourage teachers to accept assignments to multigrade schools.

It should be noted that there are many examples of multigrade programs which have successfully passed through the experimentation phase, but have experienced problems with the expansion phase. Two factors play an important role: (1) multigrade advocates mentioned above play a key role in supplying the needed technical information and political will needed for policy adaptation and program implementation; (2) resources must be allocated for teacher training and materials support. The importance of advocacy is illustrated in the contrasting examples of multigrade school programs in Colombia and Zambia. Advocates of Colombia's *escuela nueva* program, developed over years of deep involvement in the experimental phases, were instrumental in promoting the program's expansion to poorly served areas in Colombia. The Zambia pilot project was led by a single

international development worker located in the ministry of planning, who failed to build a supporting constituency within the ministry of education. The schools thus received no special material or financial support, and experimentation was strictly limited. Although the program succeeded in providing a full educational cycle to a few previously underserved communities, it failed to reach its potential.

Policy and implementation framework

Once the decision has been taken to expand multigrade schooling beyond the experimental phase, real resources must be committed to program development and implementation. A school mapping exercise should identify the existence of current and future multigrade schools and their needs. Governments should then decide which of these needs is best met at the local, regional or national levels and assign responsibilities accordingly. Most problems are probably best settled at the local or regional level; a decentralized administrative framework is therefore likely to serve rural schools best (see page 23). However, decisions regarding teacher training, teacher incentives, curriculum and materials development, and conduct of acceptance campaigns will most certainly continue to be made at the national level.

Teacher training

Few training programs prepare teachers for working in a multigrade environment. The result is too often that when faced with a multigrade class, teachers perform as though they were teaching several independent classes - lecturing to one grade while the others remain idle. Time on task is reduced, achievement falls, discipline degenerates, the teacher becomes frustrated and feels overworked. Inclusion of multigrade teaching techniques in training programs can give teachers the skills they need to effectively manage a complex classroom environment. These skills will be useful for the large numbers of teachers who will find themselves in multigrade schools, as well as for single grade teachers, who will find that many multigrade techniques will improve their own teaching.

Teacher training programs need, first and foremost, to emphasize effective teaching practices. These include: peer tutoring, self-directed learning, teacher preparation (planning, organization and delivery methods), maintenance of an orderly environment, and assessment and feedback skills. Other more culturally specific effective teaching practices may emerge from local studies of educational systems and should be incorporated into teacher training programs.

Teachers should also be trained in the use of classroom materials they will be working with -- class or school libraries, self-learning materials, and teachers guides. They should be made aware of different possibilities for laying out a classroom to suit their needs, and of grouping students by skill level.

Some teacher training programs also help to make trainees aware of the special challenges they will face working in rural schools. Many American states have developed materials to try to prepare teachers for teaching and living in rural communities (Massey and Crosby, 1983; Blackwood, 1987; Miller, 1988) and give them skills they may need to deal effectively with extra-curricular roles they may play in the community.

Teacher training may take place in a number of venues. Multigrade techniques may be introduced in pre- and in-service training programs. The best training programs alternate training and practical experience. Colombia has found the use of model schools to be very effective. Radio broadcasts have been used for teacher training in Nigeria, Tanzania and Zimbabwe. Teacher newspapers or professional journals can also be effective devices for spreading new ideas, in addition to combatting rural teachers' sense of isolation (see page 22). Training should not be a one time shot, but a series of re-enforcing workshops and visits over many years. Programs should be constantly re-adapted to practical, real problems. "Practice teaching" or the 2-3 month attachments to a school play are a critical part of teacher training. This professional training should be expanded to include two or three schools, at least one of which should be a rural multigrade school.

Teachers as *animateurs*

Teachers in Guinea are expected to play a vital role in improving the image of rural schools in order to increase the demand for education. Teachers must therefore be competent and feel comfortable living and working in rural areas. Training programs help to sharpen teachers pedagogical skills, but should also help to create an accurate image of the role of the school in the community's social and economic life; and provide teachers with a framework for animation activities. These may include informal education; promotion of cultural, sporting, social or folkloric activities; or assistance in village development projects. Rural teachers, in short, are expected to be competent in their teaching positions, as well as in their role as animater in order to promote the school an integral part of village life and increase the demand for education (Cruchet, 1989).

Conduct of teacher training programs should reflect the guiding principles of multigrade instruction -- emphasis should be put on participatory learning, peer tutoring, and management of the learning process. Annex IV provides a sample pedagogical workshop plan for teachers and administrators. The content of teacher training programs should be consistent with the choice of classroom management techniques (see page 12).

The incidence of multigrade schools, and the possibilities for using multigrade techniques in single grade schools justifies including such techniques in the regular teacher training programs. Programs should push teachers to see themselves as resource people, as facilitators and managers of the learning process.

Teacher recruitment and support

Multigrade teachers are usually assigned to small schools with one to three staff members. These teachers find themselves responsible for student counselling, school administration and maintenance. Moreover, teaching multigrade classes puts heavy demands on teachers' time and organizational skills, for which there is often no extra compensation. Some find life in rural areas difficult from both a psychological and a physical

point of view, and are therefore reluctant to accept teaching posts in remote areas. The most qualified and experienced teachers tend toward urban areas. Teacher morale is difficult to maintain under such circumstances. Because of these and other factors, many countries find it difficult to staff rural schools.

The decision to improve educational access and quality in rural areas by increasing the number, quality, and support of teachers posted to those areas is a national level decision. Countries have adopted various policies to encourage teachers to accept rural postings. Senegal, for instance, has experimented with salary supplements. However, salary incentives for rural multigrade teachers may lead to demands for similar advantages from teachers in other difficult assignments. Provision of teacher housing is a commonly used option. Another is increasing local recruitment, e.g. making a special attempt to recruit and train teachers from deficit areas. Creation of a rural teaching corps and enhanced professional opportunities for rural teachers have also been suggested.

Curriculum and materials development

The basic content of the curriculum in multigrade schools should not differ from that in single grade schools. However it may be presented in a slightly different way to facilitate multigrade teaching, e.g. through integrated or modular curricula. An integrated subject matter curriculum allows the teacher the flexibility to teach a single subject to groups at several different conceptual levels at the same time. Religion or social studies, for instance lend themselves well to integrated teaching (see page 14). Modular curricula allows the student to proceed at his own pace through a series of learning modules. Such a system is particularly well suited for rural children whose school attendance is irregular because of health problems and labor demands. Note that a modular curricula has a significant effect on the problem of repetition. Under such a system there is no repetition as such. Students work through materials at their own pace, aided by teachers, peer tutors and enrichment materials. They do not repeat subjects already mastered, do not suffer the stigma of being held back in any grade level or the trauma of adjusting to a new peer group. Finally, making the curricula open to regional or local adaptation can make schools more responsive to local needs and make education more interesting and relevant for students and teachers alike.

Development of textbooks and materials which are "user friendly," and contain self-learning and self-correcting exercises is necessary for effective multigrade instruction. Care should be taken to ensure that books are written in style which is clear and comprehensible to students, so as to allow the students to work with minimal supervision and guidance. Books which contain examples and problems which draw on students daily lives are likely to be more useful than those which contain more intangible problems. Such books and materials will be useful in single grade as well as multigrade schools. However, it is a matter of national policy to provide curriculum and textbook development units with directives to develop materials suited to multigrade instruction. One option may be to form a working group from among the best multigrade teachers from around

the country to come together once a year to adapt existing texts for multigrade use. It is also a matter of national policy to develop a textbook policy which ensures an *adequate supply* of textbooks.

Finally, a decision must also be taken at the national level on the need for *class libraries* and hence *adequate resource allocation* in the budget. The class library should contain books of interest to the students and community, as well as general reference materials such a dictionary, an atlas, and a set of encyclopedias (see page 18).

Acceptance programs

Parents, teachers and administrators all may resist adoption of multigrade programs. Parents may believe that their children will not obtain as good an education in a multigrade school as in a single grade school. Some administrators may also feel that multigrade schooling is a second class option - made necessary by resource and demographic constraints which prevent development of "complete" primary schools. Most of all, teachers may offer resistance to the expansion of multigrade education because they feel it (a) is difficult; (b) leads to lower standards of achievement; and (c) does not fit with the traditional vision of an ideal school. Some countries may therefore find it necessary to conduct acceptance programs to dispel myths that multigrade education is a second class option. The ultimate solution to this problem is exposure to and experience with successful multigrade schools.

VII. Summary of Key Issues in the Implementation of Multigrade Programs

This section reviews the critical steps in the implementation of multigrade programs. The main elements of the policy decision and development of a multigrade strategy are reviewed; then the building blocks and specific inputs for constructing a successful multigrade program.

The policy decision

Multigrade schools are a cost-effective way of providing a complete educational cycle in sparsely populated areas and for maintaining services in areas with declining populations. If properly implemented, multigrade schools offer considerable scope for reducing unit costs while maintaining or even improving quality. The decision to implement a multigrade program should be based upon:

a. results of pilot programs,

b. the results of a school mapping exercise which identifies zones where multigrade schooling would present a viable option;

c. a general review of financial and human resources available; and

d. a review of alternative policies.

Development of an implementation strategy

An implementation strategy should, at minimum, contain the following elements:

a. a budgetary commitment from government to support the program;

b. a study of effective teaching practices in the local context upon which a teacher training program will be based;

c. a plan for involving local and national managers in program development and training, from the grassroots perspective;

d. a methodology for selecting multigrade schools, either through local surveys or self-selection;

e. selection of critical learning inputs (library, textbooks, enrichment material, programmed texts, equipment, furniture, etc.);

f. a timetable for implementation; and

g. appointment of a regional or national team to oversee and advise the project.

Program building blocks

Effective teaching practices will vary according to local culture, teacher ability, and available materials. But international research has confirmed the benefits of the following practices which compose the central elements of effective multigrade teaching programs:

a. peer tutoring;

b. self-directed learning;

c. good lesson preparation by teachers;

d. creation of a conducive learning environment; and

e. frequent assessment and feedback.

Successful implementation of multigrade programs has some consequences for the classroom and school environment:

a. multigrade schools need classroom or school libraries;

b. teachers must have access to learning materials;

c. access to a radio can enhance learning, where educational broadcasting is available;

d. the layout of the classroom should facilitate multigrade teaching; and

e. some thought needs to be given to choosing the most appropriate characteristics of the class group.

At the local/regional levels, projects should make provisions for:

a. pedagogical support;

b. training of supervisors;

c. creation of an administrative support network;

d. preparation for a decentralization of authority from the central level; and

e. developing means to improve school-community relations.

Finally, at the national level, decisions should be taken regarding:

a. creation of a policy and implementation framework;

b. development of teacher, supervisor and administrator training programs;

c. creation of a system of teacher incentives; and

d. modification of curricula and materials.

VII. Conclusion

When correctly implemented, multigrade teaching programs force teachers out of the single grade delivery mode and over-reliance on rote memorization. Effective teachers see the results of their efforts reflected in higher student achievement. Teaching can become a rewarding profession when teachers are armed with a variety of delivery techniques, adequate supplies, and receive the proper pedagogical and administrative support. Effective multigrade teaching requires trained and motivated teachers, access to textbooks and learning materials, and a stimulating environment, which includes peer involvement and a library of supplementary materials. Multigrade teaching thus requires more inputs, but produces a well-rounded/developed pupil capable of self-study.

Multigrade schools are not a second class option. They can be an effective and efficient means of delivering educational services to rural areas. Because multigrade programs require human and physical inputs to implement, they may result in a marginally higher unit cost, but also lower cost per graduate due to less repetition and dropout. However, programs cannot be implemented half-heartedly. Those which adopt the requisite administrative framework but fail to provide needed resources and focus on outcomes and improved pedagogical techniques rarely meet educational needs.

Multigrade techniques should not be confined to multigrade schools alone. They have many positive pedagogical aspects which can be transferred to the single grade classroom.

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Annex I: Estimated Student Population, given Population Density and Enrolment Ratio *

1	2	3	4				
Population per sq. km	Population in 4 km Radius (Col. 1 x 50.27)	Of which 7-13 Years (18.6% of Col. 2)	Enrollments, given Different Enrolment Ratios (% of Col. 3)				
			20%	40%	60%	80%	100%
10	503	94	19	37	56	75	94
15	754	140	28	56	84	112	140
25	1257	234	47	94	140	187	234
50	2514	468	94	187	281	374	468
75	3770	701	140	281	421	561	701
100	5027	935	187	374	561	748	935

* Grey shaded areas indicate strong potential for multigrade schools

Multigrade schools are a viable option in areas of low population density. For instance, the above example illustrates potential school populations given population density and enrolment rates in Tanzania (Fredriksen, 1984). The school age population in a 4 kilometer radius area is estimated to be 140 where the population density is 15 people per square kilometer and the enrolment rate is 100%. It is also 140 where the population density is 75 and the enrolment rate only 20%. In such a case the average class size for a six grade primary school would be less than 25 students; higher grades are likely to be much less when dropout is taken into consideration.

Multigrade schools offer opportunities for economy in such a situation by promoting some combination of grades under the direction of one teacher in one classroom. For instance, one teacher and classroom may be assigned each to grades 1 and 2, while another teacher and classroom are allocated to combined grades 3 and 4, and yet another to combined grades 5 and 6, thus providing a full educational cycle. Resources saved from not developing a six-grade, single-grade school may be used to increase spending on vital inputs such as textbooks, teacher salaries or teacher training, or to expand educational opportunities elsewhere.

Annex II: Costs and Savings of Implementing a Multigrade Program

There are several costs to consider in designing a multigrade schools program, many of which do not differ from single grade school improvement programs. These items are listed below. Costs vary from country to country: a separate costing exercise should therefore be completed for each country to determine the viability of implementing a multigrade schools program. A sample of such an exercise is presented in Annex IA.

Multigrade schools generally have higher textbook and materials costs, and higher furniture costs. Savings can be expected from more efficient use of classrooms and teachers. Additional savings may be achieved if the multigrade school results in lower dropout and repetition rates and increased community contributions.

Costs of Implementing a Multigrade Program

Start up costs

(1) Preliminary studies (if existing data is inadequate)
  (a) School mapping exercise
  (b) Financial and human resources review
  (c) Local surveys
  (d) Study of effective teaching practices
(2) School construction and renovation (classrooms slightly larger than conventional classrooms)
(3) Equipment
  (a) Blackboards
  (b) Display boards
  (c) Simple duplicating device
  (d) Radio (if applicable)
(4) Furniture
  (a) Shelves
  (b) Lockable cabinets
  (c) Tables
  (d) Moveable desks and chairs
(5) Teacher housing construction
(6) Classroom or school library books
(7) Adaption of self-learning texts and materials
(8) Adaption of teacher and administrator training programs
(9) Development of regional resource centers
(10) Review and adaption of administrative structures to establish management and financial formulas to permit, support and enhance multigrade teaching
(11) Conduct of an information/acceptance program

Recurrent costs

(1) Teacher and administrator training
  (a) pre-service training program
  (b) in-service training program, including funds for teacher association meetings.
(2) Administrative and pedagogical support
(3) Textbook and library re-supply
(4) Classroom supplies (paper, ink, chalk, etc.)
(5) Classroom, furniture, equipment maintenance
(6) Maintenance of regional resource center
(7) Teacher/professional journal
(8) Incentive program for teachers (optional)

Scope for Cost Savings in Multigrade Programs

(1) More efficient use of teachers
(2) Fewer classrooms needed than in conventional schools
(3) Lower repetition and dropout
(4) Better school-community relations may translate into increased scope for local contributions
(6) Better administrative and pedagogical support means teachers are on task more and performing more efficiently and effectively

Table IIA illustrates the costs of school expansion in an area of low population density. The example assumes a primary school student population of 105, or approximately 17 per grade. The choice is whether to construct, furnish, supply and staff six-class, single grade school or a three class multigrade school.

The multigrade option offers considerable scope for cost savings with regard to both investment and recurrent costs. Investment costs are lower primarily because the multigrade school uses fewer (though larger) classrooms than the single grade option (lines 1. and 2.). The multigrade school, requires higher investments in the classroom libraries (line 6.) and furniture (line 12.). The result is a fixed cost per student place 31% lower in multigrade than single grade schools (line 16).

Recurrent costs in multigrade schools are lower in this example because multigrade schools use fewer teachers than single grade schools (line 17). Teacher costs are still lower in multigrade schools when a salary supplement is added in (line 18). Maintenance costs are lower because these are a function of investment costs (line 19). Again, there are higher costs associated with books and supplies in the multigrade school (line 20). The end result, however, is a recurrent cost per student place which is 35% lower in the multigrade than single grade option (line 22).

It should be noted that not all school systems have the luxury of choosing between the ideal single grade and multigrade options presented above. More often than not, the type of school building and number of teachers is not variable (these will only be variable when substantial funds are available for new construction and teacher training). School planners simply make due with what is available. Savings on construction, maintenance and teacher salaries are therefore largely ruled out. The question becomes one of maximizing quality and quantity of educational services given resource constraints. In most countries opportunities exist to increase quantity of educational services by encouraging single grade teachers in incomplete schools to become multigrade teachers. Small additional investments in training, books, and supplies could then result in higher coverage.

Table IIA: Comparison of Costs - Multigrade and Single-grade Options (number of students is 105)

			Traditional Six Grade Option		Three Multigrade Classroom Option		
	COST OF INPUTS	Unit cost	Number	Total cost	Number	Total cost	Savings
1.	classroom construction	22000	6	132000	0	0	
2.	large classroom construction	26000	0	0	3	78000	
3.	office/library construction	17000	1	17000	1	17000	
4.	textbooks	5	209	1047	209	1047	
5.	school library	700	1	700	1	700	
6.	classroom library	350	0	0	3	1050	
7.	blackboard	85	6	510	6	510	
8.	display board	65	6	390	3	195	
9.	duplicating device	60	3	180	3	180	
10.	shelves	300	6	1800	6	1800	
11.	lockable cabinets	500	6	3000	6	3000	
12.	conference table	450	1	450	4	1800	
13.	moveable desk and chair	80	105	8378	105	8378	
14.	office furniture	2000	1	2000	1	2000	
15.	Total Fixed Costs:			167455		115660	
16.	Fixed Costs per Student:			1599		1104	31%
17.	teacher (per year)	1400	6	8400	3	4200	
18.	multigrade teacher salary supplement	140	0	0	3	420	
19.	maintenance (5% of building and			8231		5599	
20.	books and supplies (renewed every 3			577		923	
21.	Total Recurrent Costs:			17208		11142	
22.	Recurrent Costs per Student:			164		106	35%

Opportunities for Cost Savings through Reductions in Repetition and Dropout

Quality improvements associated with multigrade schools which reduce repetition and dropout can result in considerable cost savings per graduate. For example, research in Colombia revealed the following differences between multigrade *escuelas nuevas* and graded rural schools (Schiefelbein, 1991):

Colombia: Repetition and Dropouts, 1987 (%)

Indicator	*Escuela Nueva*	Graded Rural School
Repetition	47.2	53.9
Dropout, grade 1	10.5	8.6
Dropout, grade 2	5.1	9.3
Dropout, grade 3	2.9	7.8
Dropout, grade 4	0.7	7.9
Dropout, grade 5	-3.0	11.1

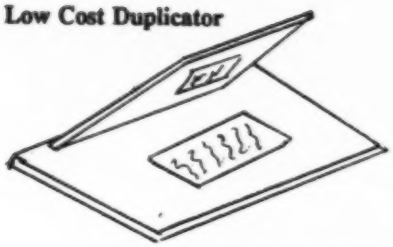
Repetition in *escuela nueva* is lower than in comparable graded schools. Although dropout was higher in grade 1 of *escuelas nuevas* than in graded schools, it was much lower in grades 2-5. (The dropout figure is negative for grade 5 *escuela nueva* because more students were enrolled in this grade at the end of the school year than in the beginning.) The summary result of this table is that *escuela nueva* schools show a decrease in repetition of 12.4% and an overall reduction in dropout of 1.2%. The *escuelas nuevas* therefore move relatively *more* children through the system at a *faster* rate than comparable graded schools.

At an average annual unit cost of $100 per pupil, the cost per graduate in the traditional school is $1,674 versus $1,089 in the *escuelas nuevas*, given the above repetition and dropout rates. Even if expenditures were raised by 10% to cover extra books, materials, and teacher training used in multigrade schools, the cost per graduate in the *escuela nueva* would still be only $1,197 -- considerably lower than in the graded school. In fact, expenditures per student could be raised by as much as 50% in the *escuelas nuevas* and they would still produce graduates at the roughly the same cost as the graded school spending only $100 per student.

	Cost per Graduate *	
Investment per Pupil	Graded School	*Escuela Nueva*
$100	$1,674	$1,089
$110	$1,841	$1,197
$150	$2,511	$1,633

* Methodology for computing costs is described in Cuadra and Fredriksen (1991). A complementary lotus based simulation model is available from PHREE.

Annex III: How to Make a Low Cost Duplicator



1. You will need the following tools:

   (a) a stapler

   (b) a pencil

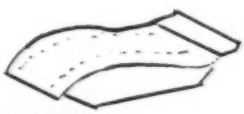
   (c) a hammer

   (d) a saw

   (e) a ruler

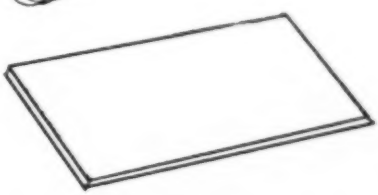
2. You will need the following materials:

   (a) a half meter square of fine cloth

   (b) an ink stencil 

   (c) a role of scotch tape 5 cm wide

   (d) 2 meters of wood (2 x 3 cm)

   (e) nails (5 cm) 

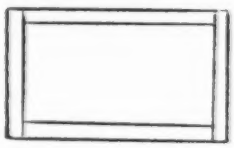
   (f) 2 hinges

   (g) a piece of plywood with 5 layers of finishing (40 x 60 cm)

3. To make the frame in wood:

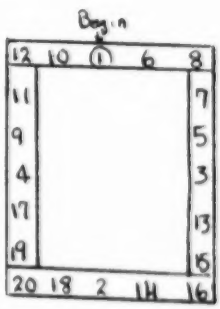
(a) measure 2 pieces of wood 30 cm long, and 2 pieces 50 cm long. Cut the pieces with the saw so that the ends are square and smooth.

(b) arrange the pieces in the shape of a frame and nail together. Be sure that the ends are correctly and firmly joined.

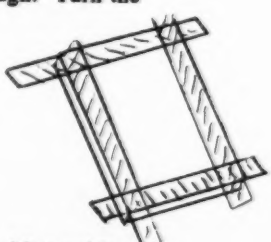


(c) then, to attach the cloth to the frame, spread the cloth over a smooth, clean surface. The cloth must be big enough to cover the 4 edges of the frame.

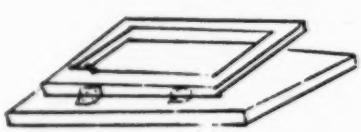
(d) firmly staple the cloth: to do this, begin by stapling the centers of each side, then the corners. If you do not have a stapler, you can use thumbtacks.



(e) now you can "mask" the screen. This means you can cover the parts you do not want the ink to go through. For this, mark off on the screen the exact place where the paper will be placed (use a stencil to see how it can be positioned). When the margins are carefully drawn, cover the exterior part of the screen with scotch tape so that the ink will not go through. Turn the screen over and cover the interior with scotch tape.



(f) then place the "masked" screen on the plywood and fasten it with two hinges.



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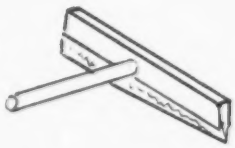
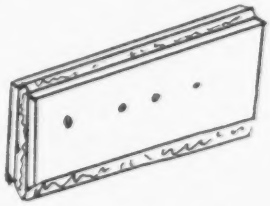
(g) you will need an instrument to spread the ink evenly and carefully. You can use a squeegee. It is also easy to make one yourself:

(i) take 2 pieces of plywood 5 cm thick and a long piece of rubber (e.g. the interior part of an old tire)

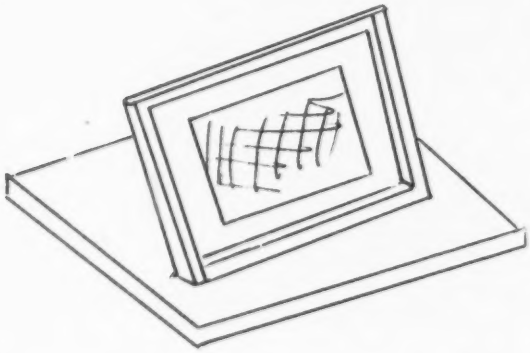


(ii) make a sandwich (that is to say place the rubber between the two pieces of plywood). Nail together.



(iii) this instrument must be a bit smaller than the width of your screen.

4. You are ready!



Annex IV: Sample Pedagogical Workshop for Teachers and Administrators

I. Introduction

This annex presents a sample framework for a workshop to train teachers and their supervisors. It will limit itself to the description of different steps of work in order to present a clear picture of the structure of the program. The workshop is based on layered series of observation, group work and discussion/review. It is designed to keep attention focused on what is actually happening in the classroom, and to build conclusions based on real, observable behavior.

For a sample training guide with detailed subject matter, see: Colbert de Arboleda, Vicky and Oscar Mogollon Jaimes. *Hacia La Escuela Nueva Unidades de Capacitacion para el Maestro*. Bogata, Colombia Ministry of Education, 1980.

II. Participants

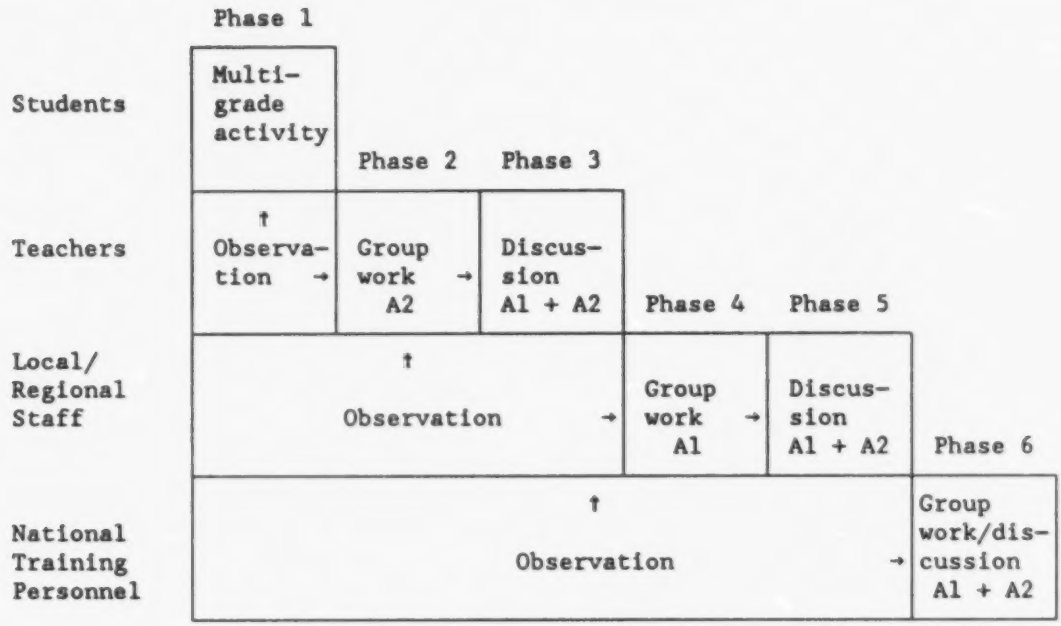
A. A group of 50 students of two or three different grade levels.
B. Ten teachers.
C. Ten to 15 local and regional managerial/administrative staff (headmasters, pedagogical advisors, supervisors, district education officers, etc.).
D. Five national level training personnel.

III. Objectives

A. Provide teachers with an introductory or proficiency course.
B. Enable managerial/administrative staff to organize workshops and supervise classes.
C. Enable national training personnel to direct training operations aimed at various audiences.

IV. Activities

A. Activities are presented in the following table; the two trainers are represented by A1 and A2:



V. Conduct of the Workshop

A. Initial activity: observe an experience. In the example above, it is one of teaching three grade levels at one time.
   1. Teachers observe the class conducted by trainer 1.
   2. Local and regional staff observe three phases of work with teachers (Phases 1,2,3).
   3. National training staff observe three phases of work with the teachers and the two following phases with the local and regional staff (Phases 1,2,3,4,5).

B. Intermediate activity: group work centered on problems observed by the participants.
   1. Phase 2: conduct of the class. Difficulties? What would you do if... etc. Action plans for the class.
   2. Phase 4: sequencing of teacher training. How to organize training? How to lead a final discussion? Difficulties? Plan of action.
   3. Phase 6: training of the two levels. Where to intervene? How to evaluate the results? Plan of action. When? With whom? How to prepare the work... Etc.

C. Final activity: responses to problems uncovered, information given to each group of participants, documents, supplementary readings, list of projects underway, supervision guides, etc.

VI. Possible Extensions

A. One can imagine and build a large diversity of workshops: just pay attention to the order of the activities: (1) observation; (2) group work; and (3) discussion/review.

B. Examples of variations:
   1. Length could be varied. In the workshop presented above, the length could be three days (six half days), but it could be spread out over a week, allowing for travel.

2. The activities described could be separated by brief opportunities for practical application.
3. The first action (observation) could take diverse forms: taking account of personnel experience (initial or continuing training, etc.), draw together lessons given to the participants (overview of the seminar, video, a case study to be reviewed individually, etc.)
4. The discussion done immediately after the group work, but one could also refer participants to a case study, or bring in a guest speaker.

VII. Constraints

A. It takes a lot of time to prepare a workshop - almost as much as it does to run the workshop itself.
B. It requires talented group trainers - with skills in speaking, listening, balancing conversation, launching debate, focusing on central points, synthesizing, and responding to problems that come up in the course of the session.
C. One must have strict respect for the rules - avoid distractions which could disrupt the workshop.
D. Examples:
   1. The preliminary discussions should not be limited to descriptions of the way the training will be presented and the rules to be followed, but they should introduce and get the audience interested in the content. Sometimes, under the pretext of introducing topic, one can make bold, catchy statements which are not necessarily grounded in reality.
   2. From time to time, higher level staff may interrupt with an irrelevant point or try to change the subject. Or participants may abandon their roles as observers and begin to speak. It requires a good trainer to keep the program on track.

VIII. Conclusion

A. This technique might seem difficult to trainers. In reality, it requires nothing more than a few training sessions and a willingness to abandon certain habits.
B. In sum, it assures an anchoring of training in reality and placing it in a coherent framework of defined pedagogical objectives. The training uses the very methodologies which will one hopes to promote in the classroom situation itself.

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